DOCUMENT RESUME

ED 214 328 EC 141 540

AUTHOR McBeath, Marcia; And Others
TITLE Identifying Low Income, Minority, Gifted and Talented Youngsters.
INSTITUTION District of Columbia Public Schools, Washington, D.C.
SPONS AGENCY Department of Education, Washington, D.C.
PUB DATE 26 Aug 81
NOTE 19p.; Paper presented at the Annual Meeting of the American Psychological Association (Los Angeles, CA, August 26, 1981).

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Academic Persistence; Creative Thinking; *Economically Disadvantaged; Elementary Secondary Education; Eligibility; *Gifted; Minority Groups; Socioeconomic Status; Special Programs; *Talent; *Talent Identification
IDENTIFIERS District of Columbia Public Schools

ABSTRACT

The study evaluated the identification process for programs for the gifted and talented in the District of Columbia public schools. The authors (McBeath, Blackshear, and Smart) used the Baldwin Identification Matrix (which includes an informal creative thinking test, reading and mathematics tests, grades, and nominations) as a data management system. The 205 students identified were compared with a random sampling of 205 students not selected for the program. Results of the first discriminant analysis indicated that the highest contributor to identification was total nominations (peer, parent, and teacher). The next three contributing variables in descending order were peer nominations, mathematics, and parent nominations. When socioeconomic status was added as a variable, there was no change in the top discrimination coefficient suggesting that socioeconomic status did not play a very important part in the selection process though it did influence the structure of the discrimination function. When students who stayed in the program were compared with students who did not, total nominations was still the predictor variable contributing most to the function, followed, however, by reading, creative thinking, and mathematics. When socioeconomic status was considered, the variable contributing most to identification of students who stayed in the program from those who didn't was creative thinking, followed by parent nominations, socioeconomic status, and reading. (DB)

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IDENTIFYING LOW INCOME, MINORITY, GIFTED AND TALENTED YOUNGSTERS(1)

Marcia McBeath(2) Leslie Smart(3)
Patsy Baker Blackshear(4)

Introduction

In the fall of 1977 a Title IV-C grant, Minigrant Program for the Academically Gifted and Talented (G/T), was secured to focus on the needs of gifted and talented students in the District of Columbia Public Schools. Special attention was devoted to identifying and servicing the economically disadvantaged from this population. Based upon competitive application twelve school-based projects representing each of the school system's six administrative regions were identified to participate in the program. Two projects operated in each each region, one at the elementary level and one at the junior high level. Elementary projects began the 1978-79 school year with services to students in grades K-3; junior high school projects began with services to 7th grade students. By the end of a proposed three years of

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(1) This paper was presented at the 1981 Annual Convention of the American Psychological Association, Los Angeles California, August 26, 1981.

The project reported on in this paper was developed under grants from ESEA Title IV-C in the Education Department and a State Grant from the Office of Gifted and Talented U.S. Department of Education. The contents do not necessarily represent the policy of the agency or endorsement by the Federal Government.

(2) Director, Title IV-C Evaluation Unit, Division of Research and Evaluation, District of Columbia Public Schools, Washington, D.C.

(3) Educational Research Assistant, Title IV-C Evaluation Unit, Division of Research and Evaluation, District of Columbia Public Schools, Washington, D.C.

(4) ESEA Title IV-C Project Coordinator, Minigrant Program for the Academically Gifted -Phase III, District of Columbia Public Schools, Washington, D.C.

EC141540

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program support, it was anticipated that these projects for the academically gifted and talented would be servicing students in grades K-9, a new grade level being added each year.

The identification procedure flowed from the definition which refers to the use of multiple criteria to select students who fall within the upper ten percent of a school's population. This concept embraces the idea of giftedness as a relative measure since students are compared only to others in the same school at the same grade level. Hence, during the first and second years of services to students, school norms for the assessment items used (see attached profile) were developed for each of the twelve projects. Students identified for services during the 1980-81 school year were identified with similar criteria. However, the data compiled over the last two years led to the initial use of system-wide norms.

The Gifted/Talented Education Program of the D.C. Public Schools operated as a catalyst for the development of citywide services for students demonstrating or showing potential for exceptional abilities. One of the major objectives was the development and evaluation of a multiple criteria identification process that could be applied throughout the School System.

As in other major cities, Washington, D.C. has students from all economic levels. The vast majority, however, over sixty percent of the public school students attend Title I schools. Similarly the city has a wide range of ethnic and racial groupings. The proportion of Black students in this School System, however, is the largest in the nation, better than ninety-five percent.

Unlike most urban systems, the D.C. Public Schools do not use group intelligence tests. In the late 1960's the School System discontinued such tests after the courts declared that the tracking process resulting from their use was discriminatory. Thus, in order to screen for students who would be eligible for the program an identification procedure that would be more inclusive than exclusive was needed.

Identification Procedure

The Baldwin Identification Matrix (BIM) was used as a data management system to identify the academically gifted and talented students who participated in the program. The identification assessment items on the BIM included an informal creative thinking test (figural), reading and mathematics tests, grades and nominations. The creativity test was adapted from the Minnesota Tests of Creative Thinking by E. Paul Torrance. Students were given a sheet of paper with circles on it and instructions to make objects from them. The total raw score summed the partial scores in the areas of fluency, originality, elaboration and flexibility.

The Comprehensive Test of Basic Skills (CTBS) is a nationally standardized achievement test presently used in the Dstrict of Columbia Public Schools as part of the overall testing program. Where students had no CTBS scores recorded, the reading or mathematics score from the Prescriptive Reading Test (PRT) or the Prescriptive Mathematics Test (PMT) was substituted. The PMT and PRT are criterion referenced tests developed by California Test Bureau/ McGraw Hill for the District of Columbia Public Schools.

Grades recorded on the BIM were based on the standard numerical formula where A=4.0. The score used came from a composite of grades that affected the particular instructional focus of the local school program. Solicited nominations came from parents, teachers and peers. Even though they were allowed, almost no unsolicted nominations were received. Peer nominations were derived from sociometric information requested from students concerning their classmates. They were to list, for example, "Who always asks a lot of questions?" Teachers were asked to complete nomination forms that required them to check the characteristics of their students which matched those exhibited by gifted and talented students. Parents were asked to complete similar forms.

The identification of the students was based on the BIM scores generated independently in each of the participating schools. Using the BIM, it was possible to rate students in comparison to others at the same grade level in that school. (See attached profile.) On each measuring instrument the median score for that school's population was used as a baseline. The difference between the median score and the top score was evenly divided into five groups. Descending weights from five to one were given to student scores filling in each of the five groups from top to median. For example, the student whose BIM is reproduced in the attached profile has a CTBS Mathematics Computation percentile score of 58. This fell into the second category up from the median, giving it a weight of two (2). The child's CTBS Language-Reading score was 93 placing it in the top group with a weight of five (5). Using the weighting method, students were not eliminated if they had some weakness on a particular assessment item as long as their total weighted score ranged in the top 10% of the school.

Research Questions

The researchers wondered which of the BIM items best discriminated between students who were selected for the program and those who were not. Were there other factors such as sex of student or socioeconomic status which affected the selection to a greater degree? What about students who were selected but did not remain in the program? During the 1979-80 school year there were 52 such students who discontinued the program for various reasons. Eighteen of the 52 students discontinued because they either were incorrectly scheduled or they transferred out of the system. The remaining 34, which represented 66% of the discontinuing students, fell into one of the categories listed here: Learning Difficulty; Adjustment Problem; Health/Personal Problem; Removed by Parents; and Self Deselection. The researchers wondered which identification factors might discriminate this group from those who stayed in the program.

Through the use of a discriminant analysis with the variables, creativity score, mathematics score, reading score, grade point average, peer nominations, parent nominations, teacher nominations, total nominations, sex and socioeconomic status (determined by free lunch eligibility), answers to the following questions were sought:

1. What factors differentiate students who are selected for the program from those who are not?
2. What factors differentiate students who remain in the program from those who do not?

Research Design

During the spring of 1979 using the first revision of the identification process, approximately 2700 students in the target school were screened for

the Gifted/Talented program to participate during the 1979-80 school year. Of the approximately 270 students who qualified for placement based on the BIM, data were available on 225. Since the kindergarten screening for first grade inclusion differed from the rest, the 20 students from that grade were not used in the analyses, leaving a total of 205 students in the in-program group.

From the 2400 students who did not qualify for placement, 205 were selected by the random number method to represent the not-in-program group. Using these two groups and the variables listed in the Research Questions section, a discriminant analysis was performed to find the variables which, in combination, maximized the variance between those students who were selected for the program and those who were not selected.

The second question was concerned with students who a qualified for the program but did not remain in it. Of the 225 students who qualified for the 1979-80 school year program, 30 elected not to participate, 52 began the program but left before the end of the year and 140 remained in the program. The two groups used for the second question were (1) those who stayed in the program and (2) those who were qualified but did not begin or who began but left the program. Eliminating the kindergartners the final analyses were done on 123 stayed-in-program students and 82 left-program students.

Again using the variables listed in the Research Questions section, a discriminant analysis was performed to find the variables which, in combination, maximized the variance between those students who remained in the program and those who did not.

Results

The first analysis compares the students who were selected to participate in the program (group 1) with a random sample of those students who were not

selected (group 2). A total of 45 cases were dropped from the analysis due to missing data on a discriminant variable resulting in 365 cases being used. Group 1 had 178 cases with the remaining 187 cases in group 2. From the first analysis, all of the BIM data plus sex of student were used as variables. A stepwise discriminant analysis using Wilks' Lambda as a criterion for selection was performed to eliminate any predictor variables proved not to be useful. (See Table 1).

TABLE 1

SUMMARY TABLE FOR THE DISCRIMINANT FUNCTION ON STUDENTS SELECTED FOR THE PROGRAM AND THOSE NOT SELECTED

VARIABLES	VARS IN	WILKS' LAMBDA	SIGNIFICANCE
Mathematics	1	0.398233	0.0000
Reading	2	0.330055	0.0000
Creative Thinking	3	0.294337	0.0000
Nominations (Total)	4	0.262764	0.0000
Peer Nominations	5	0.248826	0.0000
Parent Nominations	6	0.235207	0.0000
Grade Point Average	7	0.223180	0.0000
Teacher Nominations	8	0.214051	0.0000
Sex	9	0.213161	0.0000

The results of the stepwise procedure presented in Table 1 show that nine predictor variables were entered and tested, and all of them were selected.

Table 2 shows the results of the first analysis.

TABLE 2

CANONICAL DISCRIMINANT FUNCTION FOR THE SELECTED AND NON-SELECTED GROUPS

Canonical Correlation	Wilks' Lambda	Chi-Square	D.F.	Significance
0.8870393	0.2131613	554.14	9	0.0000

Table 2 shows that the canonical function of the nine predictor variables produces a high degree of separation as indicated by the final Wilks' Lambda (.21316) and a canonical correlation of (0.887). The chi-square analysis reported in Table 2 shows that the discriminant function prediction equation facilitates a more accurate prediction than would be experienced if chance alone dominated the selection process.

The standardized discriminant function coefficients for this analysis are presented in Table 3.

TABLE 3

STANDARDIZED CANONICAL DISCRIMINANT FUNCTION COEFFICIENTS FOR THE ANALYSIS OF SELECTED/NON-SELECTED GROUPS

VARIABLE	FUNC 1
Nominations (Total)	1.18812
Peer Nominations	-0.49929
Mathematics	0.48424
Parent Nominations	-0.44685
Creative Thinking	0.39442
Reading	0.33185
Teacher Nominations	-0.32756
Grade Point Average	0.30633
Sex of Student	-0.07531

As may be seen in Table 3 the highest contributor to the function is total nominations. The other eight variables listed in descending order are peer nominations, mathematics, parent nominations, creative thinking, reading, teacher nominations, grade point average and sex. Three of the top four (largest) contributors to the discriminant function are related to nominations and therefore the function can be called a nominating function.

When socioeconomic status (SES) is entered into the equation 145 cases are excluded from the analysis due to lack of data. Group 1 now contains 83 cases and group 2 has 183. Ten predictor variables were entered into the stepwise procedure and sex of the students was removed from the analysis. Table 4 shows the results of the next analysis.

TABLE 4

CANONICAL DISCRIMINANT FUNCTION FOR SELECTED/NON-SELECTED GROUPS ADDING SOCIOECONOMIC STATUS AS A VARIABLE

Canonical Correlation	Wilks' Lambda	Chi-Square	D.F.	Significance
0.8647677	0.2521769	356.12	9	0.0000

The canonical correlation as shown in Table 4 remains high and the Wilks' Lambda still indicates a high degree of separation. The chi-square analysis reveals that the discriminant function prediction equation produces a selection which is significantly different from chance.

In Table 5 the results of the classification of known cases using the two discriminant functions are presented.

TABLE 5

RESULTS OF THE CLASSIFICATION EQUATION WITH AND WITHOUT SOCIOECONOMIC STATUS (SES)

Classification Results - With SES

Actual Group	No. of Cases to Develop Prediction	No. of Cases for Classification	Predicted Group Membership 1	2
Group Selected 1	82	205	201 98.0%	4 2.0%
Group Not Selected 2	183	205	8 3.9%	197 96.1%

Percent of "grouped" cases correctly classified: 97.07%

Classification Results - Without SES

Actual Group	No. of Cases to Develop Prediction	No. of Cases for Classification	Predicted Group Membership 1	2
Group Selected 1	178	205	204 99.5%	1 0.5%
Group Not Selected 2	187	205	8 3.9%	197 96.1%

Percent of "grouped" cases correctly classified: 97.80%

Table 5 shows that when SES is used in the classification equation there is only a slight lowering in the accuracy of the equation to classify the cases correctly into their groups.

The canonical discriminant function coefficients' order is different when SES is used. (See Table 6).

TABLE 6

STANDARDIZED CANONICAL DISCRIMINANT FUNCTION COEFFICIENTS
FOR THE ANALYSIS OF SELECTED/NON-SELECTED GROUPS
ADDING SOCIOECONOMIC STATUS AS A VARIABLE

VARIABLE	FUNC 1
Nominations (Total)	1.12629
Parent Nominations	-0.47401
Mathematics	0.46057
Peer Nominations	-0.40917
Creative Thinking	0.37610
Reading	0.32999
Socioeconomic Status	0.28437
Teacher Nominations	-0.28358
Grade Point Average	0.26893

Table 6 shows that when comparing the top four predictor variables in this function to che first one (without SES) the order of parent and peer nominations is reversed. However, the first and third discriminant coefficients, total nominations and math respectively, remain unchanged.

These findings suggest that the socioeconomic status does not play a very important part in the selection process. However, its presence does influence the structure of the discriminant function.

The next analysis compares the students who were selected to participate in the program and remained in the program (group 1) with those students who were selected for the program and either participated for less than a year or did not participate at all (group 2). A total of 205 students were entered

into the analysis. Again, the BIM data plus sex of students were used as variables. Twenty seven of the cases were dropped due to missing data on at least one of discriminating variables leaving 108 in group 1 and 70 in group 2. A stepwise discriminant analysis was used and the results of this procedure are presented in Table 7.

TABLE 7

SUMMARY TABLE FOR THE DISCRIMINANT FUNCTION ON STUDENTS SELECTED FOR THE PROGRAM WHO REMAINED IN AND THOSE SELECTED WHO DROPPED OUT OR DID NOT ENTER

LABEL	VARS IN	WILKS' LAMBDA	SIGNIFICANCE
Nominations (Total)	1	0.967447	0.0160
Reading	2	0.945952	0.0077
Mathematics	3	0.932614	0.0068
Creative Thinking	4	0.916160	0.0042
Peer Nominations	5	0.909497	0.0057

Nine discriminant variables were entered into the analysis and as may be seen in Table 7 five were selected. The predictor variables whose F level were insufficient for inclusion were grade point average, teacher nominations parent nominations and sex of student.

Table 8 shows that the canonical discriminant function of the five prediction variables did not produce a high degree of separation as indicated by the final Wilks' Lambda (.663[illegible]) and a canonical correlation of .3008.

TABLE 8

CANONICAL DISCRIMINANT FUNCTION ON STUDENTS SELECTED FOR THE PROGRAM WHO REMAINED IN AND THOSE SELECTED WHO DROPPED OUT OR DID NOT ENTER

Canonical Correlation	Wilks' Lambda	Chi-Square	D.F.	Significance
0.3008366	0.9094973	16.459	5	0.0056

However, the chi-square analyses as presented in Table 8 shows that the selection process is significantly different from that which would be expected on a chance selection.

The canonical discriminant function coefficients are shown in Table 9.

TABLE 9

STANDARDIZED CANONICAL DISCRIMINANT FUNCTION COEFFICIENTS FOR THE ANALYSIS OF STAYED-IN AND LEFT-PROGRAM STUDENTS

VARIABLE	FUNC 1
Nominations (Total)	-0.76020
Reading	-0.50294
Creative Thinking	0.48062
Mathematics	0.43676
Peer-Nominations	0.38450

As may be seen in Table 9, the largest contributor to the discriminant function is total nominations.

When socioeconomic status (SES) is entered into the equation the stepwise procedure yields eight predictor variables. (See Table 10.)

TABLE 10

SUMMARY TABLE INCLUDING SOCIOECONOMIC STATUS FOR THE DISCRIMINANT FUNCTION ON STUDENTS SELECTED FOR THE PROGRAM WHO REMAINED IN AND THOSE SELECTED WHO DROPPED OUT OR DID NOT ENTER

LABEL	VARS IN	WILKS' LANBDA	SIGNIFICANCE
Parent Nominations	1	0.839262	0.0002
Creative Thinking	2	0.751757	0.0000
Socioeconomic Status	3	0.708849	0.0000
Mathematics	4	0.685821	0.0000
Reading	5	0.662113	0.0000
Grade Point Average	6	0.642805	0.0000
Sex	7	0.631142	0.0000
Teacher Nominations	8	0.619326	0.0000

The predictor variables with F values insufficient for inclusion when SES is entered into the equation are total nominations and peer nominations. Table 11 presents the canonical discriminant functions with SES as an added variable.

TABLE 11

CANONICAL DISCRIMINANT FUNCTION FOR STAYED-IN AND LEFT-PROGRAM STUDENTS ADDING SOCIOECONOMIC STATUS AS A VARIABLE

Canonical Correlation	Wilks' Lambda	Chi-Square	D.F.	Significance
0.6169882	0.6193255	36.413	8	0.0000

The canonical correlation (.6169) for this analysis is not very high and the degree of separation between the two groups represented by Wilks' Lambda (.6193) in also low.

In Table 12 the results of the classification of the known cases using the two discriminant functions are presented.

TABLE 12

RESULTS OF THE CLASSIFICATION EQUATION
WITH AND WITHOUT SOCIOECONOMIC STATUS (SES)

Classification Results - With SES

Actual Group		No. of Cases to Develop Prediction	No. of Cases for Classification	Predicted Group Membership 1	2
Group In Program	1	48	123	88 71.5%	35 28.5%
Group Left Program	2	34	82	32 39.0%	50 61.0%

Percent of "grouped" cases correctly classified: 67.32%

Classification Results - Without SES

Actual Group		No. of Cases to Develop Prediction	No. of Cases for Classification	Predicted Group Membership 1	2
Group In Program	1	108	123	107 87.0%	16 13.0%
Group Left Program	2	70	82	50 61.0%	32 39.0%

Percent of "grouped" cases correctly classified: 67.80%

As shown in Table 12 the percent of "grouped" cases correctly classified does not change when SES in added to the equation. However, the addition of the SES predictor variable does have an effect on the structure of the discriminant function.

The canonical discriminant function coefficients presented in Table 13 reveal that when SES is added to the discriminant equation, the stepwise procedure adds the predictor variable, grade point average.

TABLE 13

STANDARDIZED CANONICAL DISCRIMINANT FUNCTION COEFFICIENTS FOR THE ANALYSIS OF STAYED-IN/LEFT-PROGRAM STUDENTS ADDING SOCIOECONOMIC STATUS AS A VARIABLE

VARIABLE	FUNC 1
Creative Thinking	0.71306
Parent Nominations	-0.57295
Socioeconomic Status	0.42767
Reading	-0.37401
Mathematics	0.34114
Sex of Students	0.23846
Teacher Nominations	-0.22996
Grade Point Average	0.20932

As can be seen from Table 13 the largest contributor to the discriminant function is creative thinking. This represents a change in the order of the canonical discriminant function coefficients. When SES is added, parent nominations and creative thinking reverse order. Teacher nominations which was third, drops to the seventh position and socioeconomic status becomes third. Reading, mathematics and sex of the student remain in the fourth, fifth and sixth positions respectively followed by teacher nominations and grade point average.

SUMMARY AND DISCUSSION

In a school district where the population is predominantly Black and disadvantaged, it is important to look critically at selection procedures for any special programs. In Washington, D.C., identification of the Gifted and Talented was based on multiple criteria which included reading and mathematics achievement test scores, creativity test scores and nominations by peers, parents and teachers.

To determine which factors contribute most to differentiating students who are selected for the program from those who are not selected, and to determine which factors contribute most to differentiating students who remain in the program from those who do not, discriminant analyses were performed. The authors were also interested in the effects of socio-economic status, so this variable was included in some of the analyses.

Results of the first analysis, comparing students who were selected to those who were not, without considering the effect of socioeconomic status, showed that the highest contributor to the discriminant function was total nominations (peer, parent and teacher). The next three contributing variables in descending order were peer nominations, mathematics and parent nominations.

Adding socioeconomic status as a variable, there was no change in the top discriminant coefficient. It remained as total nominations. The same three predictor variables followed but the order was changed between parent and peer nominations. Socioeconomic status did not play a very important part in the selection process but its presence did influence the structure of the discriminant function.

The analysis comparing students who stayed in the program with those who did not, showed that the category, total nominations, still was the predictor variable contributing most to the function. However, it was

followed by reading, creative thinking and mathematics. When socioeconomic status was added as a variable, a completely different picture emerged. The variable contributing the most to the difference was creative thinking, followed by parent nominations, socioeconomic status and reading.

The following conclusions might be drawn from this study. (1.) Nominations by peers, parents and teachers have a large effect on discriminating between students who are selected to participate in the gifted/talented program and those who are not. (2.) Socioeconomic status does not contribute extensively to the factors which discriminate students who are selected to participate in the gifted/talented program and those who are not. (3.) The category, nominations, retains a high place in differentiating students who remain in the program from those who do not, but other important variables are reading, creative thinking and mathematics. (4.) Socioeconomic status contributes more heavily to discrimating students who stay in the program from those who do not. It is one of the top four discriminant variables along with creative thinking, parent nominations and reading. The last two conclusions must be considered with caution since the number of research participants was small, the canonical correlation was low, and the Wilks' Lambda was large. However, the trends are sufficient to suggest the following implications.

In terms of identification these analyses provide the basis for examining the change in the discriminating effects when a modified identification procedure is used. It also provide a basis for structuring training for program staff as it relates to instruction for students who exhibit profiles that parallel those of the students in this study who were identified as gifted but did not remain in the program.